

CLAIM AMENDMENTS

Please amend the claims as follows:

1. (Currently amended) A light source control apparatus comprising:
a plurality of ~~at least one~~ light sources, each light source emitting both a light signal at a discrete frequency and a reference signal at the discrete frequency, each light source having a different discrete frequency, the at least one light source being at least one light emitting diode (LED);
a photodetector optically coupled to the plurality of light sources, the photodetector designed to receive the light signals for the plurality of light sources; and
a plurality of at least one lock-in systems coupled to the photodetector ~~and coupled to each~~ to receive the light signals for the plurality of light sources, each lock-in system receiving the light signal from the photodetector and receiving further being coupled to and associated with one of the plurality of light sources to receive the reference signal from the one of the plurality of light sources;
wherein each lock-in system produces an intensity value ~~of the~~ for the associated one of the plurality of light sources based on the light signals for the plurality of light sources and the reference signal from the associated one of the plurality of light sources.
2. (Currently amended) The apparatus of claim 1 wherein each light source comprises:
a control unit; and
a light emitting diode (LED) ~~colored-light source~~ designed to receive a drive signal from the control unit and produce the light signal based on the drive signal.
3. (Original) The apparatus of claim 2 wherein the control unit is designed to receive a clock signal and a power signal, produce the reference signal at the discrete frequency based on the clock signal, and produce the drive signal based on the reference signal and the power signal.

4. (Original) The apparatus of claim 1 wherein the photodetector comprises a single-junction photodiode.

5. (Currently amended) The apparatus of claim 1 wherein the intensity value for the associated one of the plurality of light sources is the intensity for the associated one of the plurality of light sources of the light signal at the associated discrete frequency.

6. (Currently amended) The apparatus of claim 1 wherein each lock-in system comprises:

a frequency multiplier; and

a filter, the filter coupled to the frequency multiplier;

wherein the intensity value for the associated one of the plurality of light sources is the product of the received light signals for the plurality of light sources and the reference signal from the associated one of the plurality of light sources processed through the frequency multiplier, and filtered to remove non-dc portions.

7. (Original) The apparatus of claim 6 wherein the filter is a low-pass filter.

8. (Original) The apparatus of claim 1 wherein the photodetector comprises a multi-junction photodiode.

9. (Original) The apparatus of claim 8 wherein each junction of the multi-junction photodiode receives a portion of the light signal, the portion of the light signal received based on an associated spectra of the light signal.

10. (Currently amended) The apparatus of claim 9 wherein each of the plurality of at least one lock-in systems comprises a plurality of lock-in devices, each lock-in device coupled to the photodetector to receive a portion of the light signals for the plurality of light sources.

11. (Currently amended) The apparatus of claim 10 wherein each lock-in device comprises:
 - a frequency multiplier; and
 - a filter, the filter coupled to the frequency multiplier;wherein a partial intensity value for the associated one of the plurality of light sources is produced from the product of the portion light signals for the plurality of light sources received by the lock-in device and the reference signal from the associated one of the plurality of light sources processed through the frequency multiplier, and filtered to remove non-dc portions.
12. (Currently amended) The apparatus of claim 11 wherein the intensity value is the sum of the partial intensity values for the plurality of light sources.
13. (Original) The apparatus of claim 11 wherein the filter is a low-pass filter.
14. (Withdrawn) A method for sensing intensity of a light source:
 - emitting at least one light signal, each light signal emitted at a discrete frequency;
 - transmitting a reference signal associated with each of the light signals at the associated discrete frequency; and
 - producing an intensity value based on the light signal and the associated reference signal.
15. (Withdrawn) The method of claim 14 wherein emitting the light signal comprises:
 - receiving a clock signal;
 - receiving a power signal; and
 - producing the light signal based on the clock signal and the power signal.

16. (Withdrawn) The method of claim 14 wherein transmitting the at least one reference signal comprises:

- receiving a clock signal; and
- producing the reference signal based on the clock signal.

17. (Withdrawn) The method of claim 14 wherein producing the light signal comprises:

- receiving the light signal into a lock-in system;
- multiplying the light signal by the associated reference signal; and
- filtering non-dc portions from the multiplied signal.

18. (Withdrawn) The method of claim 17 wherein receiving the light signal comprises:

- collecting the light signal with a photodetector; and
- passing the collected light signal to the lock-in system.

19. (Withdrawn) The method of claim 17 wherein receiving the light signal comprises:

- collecting a first portion of the light signal with a first portion of the photodetector;
- collecting a second portion of the light signal with a second portion of the photodetector;
- passing the first portion of the light signal to a first lock-in device within the lock-in system; and
- passing the second portion of the light signal to a second lock-in device within the lock-in system.

20. (Withdrawn) The method of claim 19 wherein producing the light signal further comprises:

summing the first portion of the filtered light signal and the second portion of the filtered light signal.

21. (Withdrawn) A system for sensing intensity of a light source:
means for emitting at least one light signal, each light signal emitted at a discrete frequency;
means for transmitting a reference signal associated with each of the light signals at the associated discrete frequency; and
means for producing an intensity value based on the light signal and the associated reference signal.

22. (Cancelled)

23. (Cancelled)

24. (Cancelled)

25. (New) The apparatus of claim 2 wherein the light emitting diode for each of the plurality of light sources generates light at a different spectral light output.

26. (New) The apparatus of claim 25 wherein the light emitting diode for a first one of the plurality of light sources generates red light, the light emitting diode for a second one of the plurality of light sources generates green light, and the light emitting diode for a third one of the plurality of light sources generates blue light.

27. (New) The apparatus of claim 1 wherein the photodetector is a first photodetector and the plurality of lock-in systems is a plurality of first lock-in devices, further comprising:

a second photodetector optically coupled to the plurality of light sources, the second photodetector designed to receive the light signals for the plurality of light sources;

a plurality of second lock-in devices coupled to the second photodetector to receive the light signals for the plurality of light sources, each second lock-in device further being coupled to and associated with one of the plurality of light sources to receive the reference signal from the one of the plurality of light sources;

wherein each second lock-in device produces a second intensity value for the associated one of the plurality of light sources based on the light signals for the plurality of light sources and the reference signal from the associated one of the plurality of light sources.